

745
6
531.16.8
9

THE
AUTUMNAL EQUINOX

ASCERTAINED,

WITHOUT THE USE OF ASTRO-
NOMICAL TABLES.

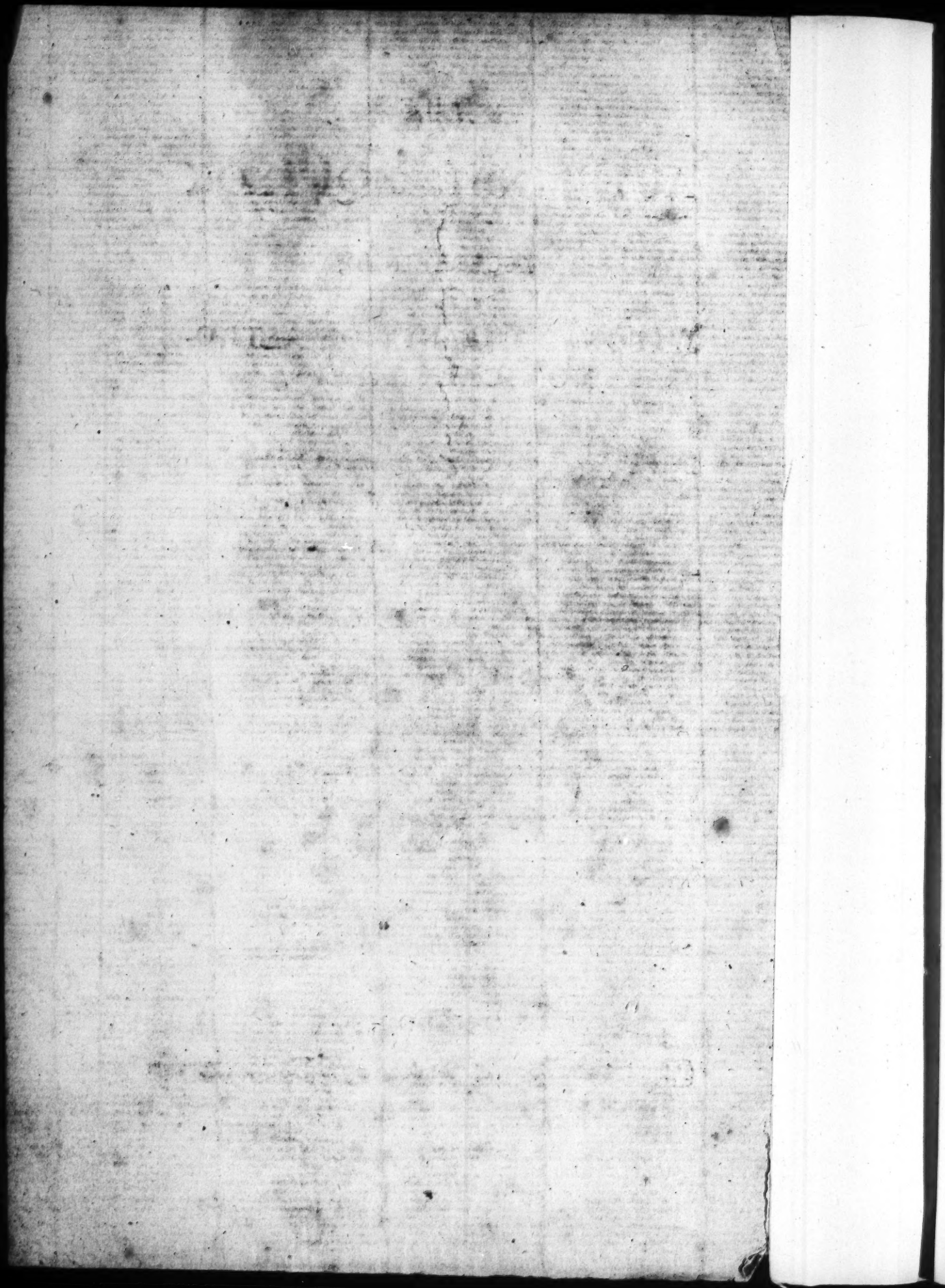
By the AUTHOR of *An Attempt to illustrate the
Usefulness of Decimal Arithmetic.*



LONDON:

Printed in the Year of our LORD M.DCC.LXX.

8



THE
WEEK-DAY, HOUR, and MINUTE,
OF THE
SUN'S ENTRANCE into LIBRA,
ASCERTAINED.

A Mean Solar Tropical Year is determined by the *mean* Excess of the Julian Year, amounting to eleven Minutes, usually call'd the Retrocession; which Quantity of eleven Minutes, is ascertained by the annual Retardation of the Equinox, being (at a medium) 5 Hours, 49 Minutes; therefore, a *mean* Tropical Year consists of 365 Days, 5 Hours, and 49 Minutes*; by which Quantity we can measure any Interval of Time.

From these mean Quantities of *Retardation*, and *Retrocession*, the following Tables are constructed; whereby the Time in which the Autumnal Equinox falls, may be discover'd more readily than by any other Method.

)(2

TABLE

* The Reader is desired to observe, We do not affirm 365 Days, 5 Hours, and 49 Minutes, to be the precise Quantity of a Tropical Year; but only propose it, as the nearest mean Quantity, to compute any Interval of Time by, that has been yet discovered.

TABLE of TROPICAL TIME.

Years.	Wd.	H.	M.	Years.	Wd.	H.	M.
9000	2	6	0	90	6	19	30
8000	5	21	20	80	1	9	20
7000	2	12	40	70	2	23	10
6000	6	4	0	60	4	13	0
5000	2	19	20	50	6	2	50
4000	6	10	40	40	0	16	40
3000	3	2	0	30	2	6	30
2000	6	17	20	20	3	20	20
1000	3	8	40	10	5	10	10
900	5	3	0	9	4	4	21
800	6	21	20	8	2	22	32
700	1	15	40	7	1	16	43
600	3	10	0	6	0	10	54
500	5	4	20	5	6	5	5
400	6	22	40	4	4	23	16
300	1	17	0	3	3	17	27
200	3	11	20	2	2	11	38
100	5	5	40	1	1	5	49

TABLE

TABLE of RETROCESSION.

Years.	D.	H.	M.	Years.	D.	H.	M.
9000	68	18	0	90	0	16	30
8000	61	2	40	80	0	14	40
7000	53	11	20	70	0	12	50
6000	45	20	0	60	0	11	0
5000	38	4	40	50	0	9	10
4000	30	13	20	40	0	7	20
3000	22	22	0	30	0	5	30
2000	15	6	40	20	0	3	40
1000	7	15	20	10	0	1	50
900	6	21	0	9	0	1	39
800	6	2	40	8	0	1	28
700	5	8	20	7	0	1	17
600	4	14	0	6	0	1	6
500	3	19	40	5	0	0	55
400	3	1	20	4	0	0	44
300	2	7	0	3	0	0	33
200	1	12	40	2	0	0	22
100	0	18	20	1	0	0	11

The foregoing Tables are formed on a Supposition that *Time commenced* from the 706th Year of the Julian Period; which is here accounted as Anno mundi 0. In which Year, the Sun

entered Libra, (in that Meridian wherein the Greenwich Observatory now stands,) on Thursday the 25th of October, or the 298th Day from the Calends of January inclusive, at 24 Minutes past 10 in the Afternoon; which Day we shall therefore take for our Epoch, as we have no authentic History prior to that Time.

The Application of the Tables is as follows.

Extract from the Table of Tropical Time, the Week-days, Hours and Minutes, answering to the given Interval, or Year of the World; to which add 10 Hours, 24 Minutes, for the time of the Epoch, and the Sum thereof will be the Week-day, Hour, and Minute of the Equinox at Greenwich.

And to get the Day of the Month, seek in the Table of Retrocession, the Days, Hours, and Minutes, answering to the same Interval of Years, which added together, will be the Retrocession of the Equinox for those Years; the intire Days whereof (adding one, if the Hours exceed Midnight) being subtracted from 298, will shew the Day of the Month; and by the Week-Day of the Equinox, and literal Character of the Day of the Month, the Domical Letter may be found.

EXAMPLES.

EXAMPLES.

Q. *The Time of the Autumnal Equinox at Greenwich, Anno Domini 327*. Anno Mundi 4334?*

Years	Wd.	H.	M.		D.	H.	M.
4000	6	10	40	_____	30	13	20
300	1	17	0	_____	2	7	0
30	2	6	30	_____	0	5	30
4	4	23	16	_____	0	0	44
Epoch	10	24					
					33	2	34
Friday	1	19	50		Retrocession.		

298
 *4007 before Christ, 33 Days Retrocession
 327 after _____
 265
 4334 Ao. Mundi. 243 to the End of Aug.

 Sept., 22 old Stile.

Literal Character F,

Dominical Letter A, Solar Cycle 28.

Answer, Friday, Sept. 22 : 19 : 50.

In casting up the Week-days, you carry by 7, and if 0 remains, it is Thursday; if 1 remains, it is Friday; if 2, Saturday; if 3, Sunday, and so on.

Q. The Time of the Autumnal Equinox at
Greenwich, Anno Domini 1767. Anno
Mundi 5774?

Before Christ 4007
1767

Interval. 5774

	Wd.	H.	M.		D.	H.	M.
5000	2	19	20	—	38	4	40
700	1	15	40	—	5	8	20
70	2	23	10	—	0	12	50
4	4	23	16	—	0	0	44
Epoch	10	24		—			

44 2 34

Tuesday 5 19 50

298

44

254

243

ii Old Stile

Sept. 22 New Stile

Answer,

Literal Character F.

Tuesday, Sept. 22 : 19 : 50.

Dominical Letter D, Solar Cycle 12.

Anno Mundi 5774, is exactly 1440 Years
later than the Year 4334, and the Equinox
fell on the same Hour and Minute of the Day,
but

As the Equinox will continue to fall on Sept. the 22d, for more than 7000 Years to come, the Table of Retrocession need not be used in any Calculation forward, the first Table being sufficient to produce the Week-Day, Hour, and Minute, on which it must necessarily happen.

At what Time will the Autumnal Equinox fall
in the Year of our Lord 1771, Anno Mundi
5778?

4007

I 77 I

		Wd.	H.	M.
5778	Interval.	5000	2	19 20
		700	1	15 40
		70	2	23 10
		8	2	22 32
	Epoch		10	24

Sunday 3 19 6

Sunday, Sept. 22 : 19 : 6

Dominical Letter F, Solar Cycle 16.

Any

Any Calculation by these Tables, may be proved in the following manner, *viz.*

Multiply the given Interval, or Year of the World, by 11, and divide the Product by 1440, and the Remainder by 60, to get the Days, Hours, and Minutes Retrocession.

Then multiply the same Interval by 1461, and divide the Product by 4, to get the Julian Reduction, in Days and Hours; from which subtract the Days, Hours, and Minutes of Retrocession, and the Remainder will be the Tropical Reduction; to which add (for the Time of the Epoch) 10 Hours, 24 Minutes; then divide the Intire Days by 7, and you gain the Week-Day, and also the Hour and Minute of the Equinox.

A Proof

*A Proof of the last Operation, wherein the given
Interval was Anno Mundi 5778.*

	5778	
	<u>5778</u>	
1440)	63558	(44 3 18
	<u>5760</u>	
	5958	
	<u>5760</u>	
	60)	198
		<u>3-18</u>
	5778	
	<u>1461</u>	
	5778	
	34668	298
	23112	<u>44</u>
	5778	254
		<u>243</u>
4)	8441658	
	<u>2110414</u>	
	44	12
		<u>44 3 18</u>
	2110370	8 42
		<u>10 24</u>
7)	2110370	19 6
	<u>301481</u>	
	+3	Sunday, Sept. 22:19:6

Sept. 11 Old Stile
22 New St.

**TABLES of the Dominical Letters,
and Cycles of the Sun, for the Old
and New Stiles, according to the
Julian and Gregorian Calendars.**

Note, those for the Old Stile continue the
same for 7980 Years.

But by the Rejection of one Day in every
hundredth Year, not equally dividible by 4, the
Dominical Letters change their Cycles, as will
be expressed in the several Tables for the New
Stile.

*TABLE by the Julian Calendar, for the Old Stile,
from the Commencement to the End of the Ju-
lian Period.*

Cycles

1 GF	2 E	3 D	4 C
5 BA	6 G	7 F	8 E
9 DC	10 B	11 A	12 G
13 FE	14 D	15 C	16 B
17 AG	18 F	19 E	20 D
21 CB	22 A	23 G	24 F
25 ED	26 C	27 B	28 A

TABLE

TABLE by the *Gregorian Calendar*, from the
15th of October 1582, to 1699, inclusive, for
New Stile.

1 CB	2 A	3 G	4 F
5 ED	6 C	7 B	8 A
9 GF	10 E	11 D	12 C
13 BA	14 G	15 F	16 E
17 DC	18 B	19 A	20 G
21 FE	22 D	23 C	24 B
25 AG	26 F	27 E	28 D

Gregorian Table,

From 1701, to 1799, inclusive.

1 DC	2 B	3 A	4 G
5 FE	6 D	7 C	8 E
9 AG	10 F	11 E	12 D
13 CB	14 A	15 G	16 F
17 ED	18 C	19 B	20 A
21 GF	22 E	23 D	24 C
25 BA	26 G	27 F	28 E

Gregorian

Gregorian Table,

From 1801, to 1899, inclusive.

1 ED	2 C	3 B	4 A
5 GF	6 E	7 D	8 C
9 BA	10 G	11 F	12 E
13 DC	14 B	15 A	16 G
17 FE	18 D	19 C	20 B
21 AG	22 F	23 E	24 D
25 CB	26 A	27 G	28 F

Gregorian Table,

From 1901, to 2099, inclusive.

1 FE	2 D	3 C	4 B
5 AG	6 F	7 E	8 D
9 CB	10 A	11 G	12 F
13 ED	14 C	15 B	16 A
17 GF	18 E	19 D	20 C
21 BA	22 G	23 F	24 E
25 DC	26 B	27 A	28 G

From

From 2101, to 2199, inclusive, the Cycles and Dominical Letters will be the same as in the Julian Table for the Old Style.

And in the next Century, from 2201, to 2299, inclusive, the Letters A G must stand against the Solar Cycle 1.

To find the Solar Cycle for any Year of our Lord, add 9 to the given Year, and divide by 28, the Remainder will be the Cycle; and if 0 remains, the Cycle is 28.

For any Year of the Julian Period, divide the given Year by 28, as before directed.

The present Year 1770 is the 6483^d Year of the Julian Period.

$$\begin{array}{r}
 1770 \\
 \underline{9} \\
 28) 1779 \quad (63 \\
 \underline{168} \\
 99 \\
 \underline{84} \\
 \text{Cycle } 15
 \end{array}$$

$$\begin{array}{r}
 28) 6483 \quad (23 \\
 \underline{56} \\
 88 \\
 \underline{84} \\
 43 \\
 \underline{28} \\
 \text{Cycle } 15
 \end{array}$$

By each Operation the Solar Cycle is 15, therefore C is the Dominical Letter Old Stile, and by the 2^d Gregorian Table it is G New Stile; which agrees with the Calendar for this Year.

The Author will think himself obliged to any Person, who shall point out to him the Errors, or Mistakes, that may be found in the foregoing Calculations.

F I N I S



